Notice of Allowability	Application No.	Applicant(s)	
	10/064,541	ARENSON ET AL.	
	Examiner	Art Unit	
	Allen C. Ho	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *amendment filed on 30 August 2004*.

2. ☒ The allowed claim(s) is/are *1,2,5,7,9,12,13,17,18,21,23,25,28,29 and 32-36*.

3. ☒ The drawings filed on *23 February 2004* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *16092004*.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with David Arnold (Reg. No. 48,894) on 16 September 2004.

The following claims have been amended as follows:

1. (currently amended) A method for reducing radiation exposure from an imaging system adapted to provide a radiation distribution about an object cavity during a scan, the imaging system including an object cavity and a radiation source having a gantry angular position wherein the radiation source is rotatably associated with the imaging system so as to rotate around the object cavity, the method comprising:

determining an entry location representative of a location of a hand, the entry location having an entry angular range;

operating the imaging system so as to cause the imaging system to emit radiation having a radiation intensity and an angular radiation distribution comprising a first angular radiation distribution suitable for a 360 degree image reconstruction ~~and~~ or a second angular radiation distribution suitable for a 180 degree image reconstruction, said first angular radiation distribution having a first average radiation distribution, said second angular radiation distribution having a second average radiation distribution, said first ~~and~~ or second angular

radiation distributions varying in intensity throughout the scan, and said first ~~and~~ or second average radiation distributions being about constant throughout said scan;

controlling said radiation intensity in a manner responsive to said entry location so as to create image data; and

processing said image data so as to create processed image data;

wherein said controlling comprises:

in response to said first radiation distribution, controlling said radiation intensity such that said radiation intensity is decreased relative to said first average radiation distribution by a predetermined minimization amount when said gantry angular position is within said entry angular range, and controlling said radiation intensity such that said radiation intensity is increased relative to said first average radiation distribution by the predetermined minimization amount when said gantry angular position is at about 180 degrees relative to said entry angular range; and

in response to said second radiation distribution, controlling said radiation intensity such that said radiation intensity is decreased relative to said second average radiation distribution by a predetermined minimization amount when said gantry angular position is within said entry angular range, and controlling said radiation intensity such that said radiation intensity is increased relative to said second average radiation distribution by the predetermined minimization amount when said gantry angular position is at about 90 degrees relative to said entry angular range.

6. (canceled)

7. (currently amended) The method of claim ~~6~~ 1, wherein said operating includes operating the imaging system so as to cause said radiation source to rotate around said object cavity.

12. (currently amended) The method of claim ~~6~~ 1, wherein said operating includes operating the imaging system so as to determine a radiation absorption angular profile, wherein said radiation absorption angular profile is responsive to said gantry angular position.

17. (currently amended) A medium encoded with a machine-readable computer program code for reducing radiation exposure from an imaging system adapted to provide a radiation distribution about an object cavity during a scan, the imaging system including an object cavity and a radiation source having a gantry angular position wherein the radiation source is rotatably associated with the imaging system so as to rotate around the object cavity, said medium including instructions for causing a controller to implement a method comprising:

determining an entry location representative of a location of a hand, the entry location having an entry angular range;

operating the imaging system so as to cause the imaging system to emit radiation having a radiation intensity and an angular radiation distribution comprising a first angular radiation distribution suitable for a 360 degree image reconstruction ~~and~~ or a second angular radiation distribution suitable for a 180 degree image reconstruction, said first angular radiation distribution having a first average radiation distribution, said second angular radiation distribution having a second average radiation distribution, said first ~~and~~ or second angular radiation distributions varying in intensity throughout the scan, and said first ~~and~~ or second average radiation distributions being about constant throughout said scan;

controlling said radiation intensity in a manner responsive to said entry location so as to create image data; and

processing said image data so as to create processed image data;

wherein said controlling comprises:

in response to said first radiation distribution, controlling said radiation intensity such that said radiation intensity is decreased relative to said first average radiation distribution by a predetermined minimization amount when said gantry angular position is within said entry angular range, and controlling said radiation intensity such that said radiation intensity is increased relative to said first average radiation distribution by the predetermined minimization amount when said gantry angular position is at about 180 degrees relative to said entry angular range; and

in response to said second radiation distribution, controlling said radiation intensity such that said radiation intensity is decreased relative to said second average radiation distribution by a predetermined minimization amount when said gantry angular position is within said entry angular range, and controlling said radiation intensity such that said radiation intensity is increased relative to said second average radiation distribution by the predetermined minimization amount when said gantry angular position is at about 90 degrees relative to said entry angular range.

22. (canceled)

23. (currently amended) The medium of claim ~~22~~ 17, wherein said operating includes operating the imaging system so as to cause said radiation source to rotate around said object cavity.

28. (currently amended) The medium of claim ~~22~~ 17, wherein said operating includes operating the imaging system so as to determine a radiation absorption angular profile, wherein said radiation absorption angular profile is responsive to said gantry angular position.

32. (currently amended) A method for reducing a physician's radiation exposure from an imaging system while maintaining patient dose and image quality, the imaging system including an object cavity and a radiation source having a gantry angular position wherein the radiation source is rotatably associated with the imaging system so as to rotate around the object cavity, the method comprising:

obtaining an object to be scanned;

operating the imaging system so as to create image data;

displaying said image data on an output device; and

processing said image data using a processing device, wherein said processing device:

determines an entry location representative of a location of a physician's hand, the entry location having an entry angular range;

operates the imaging system so as to cause the imaging system to emit radiation having a radiation intensity and an angular radiation distribution comprising a first angular radiation distribution suitable for a 360 degree image reconstruction ~~and~~ or a second angular radiation distribution suitable for a 180 degree image reconstruction, said first angular radiation distribution having a first average radiation distribution, said second angular radiation distribution having a second average radiation distribution, said first ~~and~~ or second angular radiation

distributions varying in intensity throughout the scan, and said first ~~and~~ or second average radiation distributions being about constant throughout a scan;

controls said radiation intensity in a manner responsive to said entry location so as to create image data; and

processes said image data so as to create processed image data;

wherein said processing device further:

in response to said first radiation distribution, controls said radiation intensity such that said radiation intensity is decreased relative to said first average radiation distribution by a predetermined minimization amount when said gantry angular position is within said entry angular range, and controls said radiation intensity such that said radiation intensity is increased relative to said first average radiation distribution by the predetermined minimization amount when said gantry angular position is at about 180 degrees relative to said entry angular range; and

in response to said second radiation distribution, controls said radiation intensity such that said radiation intensity is decreased relative to said second average radiation distribution by a predetermined minimization amount when said gantry angular position is within said entry angular range, and controls said radiation intensity such that said radiation intensity is increased relative to said second average radiation distribution by the predetermined minimization amount when said gantry angular position is at about 90 degrees relative to said entry angular range.

33. (currently amended) A system for reducing the physician's radiation exposure from an imaging system while maintaining patient dose and image quality comprising:

a gantry having an x-ray source with a gantry angular position and a radiation detector array, wherein said gantry defines a patient cavity and wherein said x-ray source and said radiation detector array are rotatingly associated with said gantry so as to be separated by said patient cavity;

a patient support structure movingly associated with said gantry so as to allow communication with said patient cavity; and

a processing device, wherein said processing device is adapted to:

determine an entry location representative of a location of a physician's hand, the entry location having an entry angular range;

operate the imaging system so as to cause the imaging system to emit radiation having a radiation intensity and an angular radiation distribution comprising a first angular radiation distribution suitable for a 360 degree image reconstruction ~~and~~ or a second angular radiation distribution suitable for a 180 degree image reconstruction, said first angular radiation distribution having a first average radiation distribution, said second angular radiation distribution having a second average radiation distribution, said first ~~and~~ or second angular radiation distributions varying in intensity throughout the scan, and said first ~~and~~ or second average radiation distributions being about constant throughout a scan;

control said radiation intensity in a manner responsive to said entry location so as to create image data; and

process said image data so as to create processed image data;

wherein said processing device is further adapted to:

in response to said first radiation distribution, control said radiation intensity such that said radiation intensity is decreased relative to said first average radiation distribution by a predetermined minimization amount when said gantry angular position is within said entry angular range, and control said radiation intensity such that said radiation intensity is increased relative to said first average radiation distribution by the predetermined minimization amount when said gantry angular position is at about 180 degrees relative to said entry angular range; and

in response to said second radiation distribution, control said radiation intensity such that said radiation intensity is decreased relative to said second average radiation distribution by a predetermined minimization amount when said gantry angular position is within said entry angular range, and control said radiation intensity such that said radiation intensity is increased relative to said second average radiation distribution by the predetermined minimization amount when said gantry angular position is at about 90 degrees relative to said entry angular range.

35. (currently amended) A system for reducing the physician's radiation exposure from an imaging system while maintaining patient dose and image quality comprising:

an imaging system including an object cavity and a radiation source having a gantry angular position wherein the radiation source is rotatably associated with the imaging system so as to rotate around the object cavity;

a patient support structure movingly associated with said imaging system so as to allow communication between said imaging system and a patient, wherein said imaging system generates image data responsive to said patient; and

a processing device, wherein said processing device is adapted to:

determine an entry location representative of a location of a physician's hand, the entry location having an entry angular range;

operate the imaging system so as to cause the imaging system to emit radiation having a radiation intensity and an angular radiation distribution comprising a first angular radiation distribution suitable for a 360 degree image reconstruction ~~and~~ or a second angular radiation distribution suitable for a 180 degree image reconstruction, said first angular radiation distribution having a first average radiation distribution, said second angular radiation distribution having a second average radiation distribution, said first ~~and~~ or second angular radiation distributions varying in intensity throughout the scan, and said first ~~and~~ or second average radiation distributions being about constant throughout a scan;

control said radiation intensity in a manner responsive to said entry location so as to create image data; and

process said image data so as to create processed image data;

wherein said processing device is further adapted to:

in response to said first radiation distribution, control said radiation intensity such that said radiation intensity is decreased relative to said first average radiation distribution by a predetermined minimization amount when said gantry angular position is within said entry angular range, and control said radiation intensity such that said radiation intensity is increased relative to said first average radiation distribution by the predetermined

minimization amount when said gantry angular position is at about 180 degrees relative to said entry angular range; and

in response to said second radiation distribution, control said radiation intensity such that said radiation intensity is decreased relative to said second average radiation distribution by a predetermined minimization amount when said gantry angular position is within said entry angular range, and control said radiation intensity such that said radiation intensity is increased relative to said second average radiation distribution by the predetermined minimization amount when said gantry angular position is at about 90 degrees relative to said entry angular range.

Allowable Subject Matter

2. Claims 1, 2, 5, 7, 9, 12, 13, 17, 18, 21, 23, 25, 28, 29, and 32-36 are allowed.

3. The following is an examiner's statement of reasons for allowance:

The prior art fails to teach or fairly suggest controlling the radiation intensity such that the radiation intensity is decreased relative to the average radiation distribution by a predetermined minimization amount when the gantry position is within the entry angular range, and controlling the radiation intensity such that the radiation intensity is increased relative to the average radiation distribution by the predetermined minimization amount when the gantry angular position is at about 180 degrees or 90 degrees relative to the entry angular position as claimed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

4. Applicant's arguments filed 30 August 2004 with respect to claims 33 and 35 have been fully considered and are persuasive. The objection of claims 33 and 35 has been withdrawn.

5. Applicant's arguments filed 30 August 2004 with respect to claims 1, 2, 5-13, 17, 18, 21-29, and 32-36 have been fully considered and are persuasive. The rejection of claims 1, 2, 5-13, 17, 18, 21-29, and 32-36 has been withdrawn.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (571) 272-2491. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached at (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Allen C. Ho

Allen C. Ho
Patent Examiner
Art Unit 2882